

The Relations between Sanitary Science and the Medical Profession.

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SANITARY SCIENCE.

What is sanitary science? This phrase is comparatively new, but is full of meaning. The word "sanitary," in its derivation and uses, signifies health or healthy, but when combined with science, is far more expressive. It means the application of laws or principles for the preservation of health in whatever way they may be employed. As to the use of the term science here, the claim can not justly be called in question. To such an extent have these principles been discovered and applied, and so uniformly and certainly have the same results followed, that they may be said to constitute a science—the science of health.

It is not necessary that these laws should be understood by everybody, and admitted as true, that they be considered a science; but if they have been extensively applied by a large number of good judges, and the same results never fail, they constitute, when combined, to all intents and purposes, a science—as much so as physiology or biology. As both these are comparatively modern sciences, so is that of sanitation, certainly in name and application.

It is only about forty years since this subject began to attract general attention. It started with the establishment of the registration of births, deaths and marriages, in Great Britain, by Dr. William Farr. While investigating upon a large scale the causes of death, the inquiry naturally arose, What can be done to prevent as well as to cure disease? This inquiry, from a small beginning, has resulted in the most surprising advance in a knowledge of the laws of health and life. So rapid and extensive have been these changes, that one living during this period can hardly credit them; and never were these improvements taking place faster than at the present day. But the advantages already secured, though great and invaluable, are mere harbingers of richer and more permanent blessings in store. In the progress of this science, every year has signalized the past, that it had a deeper and broader scope, not so much in improving the old methods of work, but in entering into new fields and enlisting new agencies. Its aim is not merely to remove the existing causes of diseases, but to destroy the germs or seeds of disease. It does not stop with preventing this or that contagious disease, or reduce to the minimum the zymotic class of diseases; but when the principles of this science are applied to the fullest extent, they will present the human body so sound and healthy in all its parts as in a great measure to forestall disease.

There is, we believe, a normal standard of physiology, where all the organs are so sound and well-balanced, and where all perform respectively their functions so thoroughly, as to afford small chances for disease. This organization represents the highest standard of health, and the nearer the human body in all its parts approximates to this standard, the better or higher degree of health shall every such person possess. With this view of physiology, it will be seen that all disease is a violation of law, whether it arises from internal or external cause. As there must be some change in the structure or functions of certain organs in the body, for the introduction of disease, is it not clearly the province of sanitary science to take cognizance of such changes? If the violations of law can be arrested or modified in the very first stages, may it not serve to prevent a vast amount of disease?

There is a sphere higher and broader, where the principles of this science should be brought to bear—that is, in perfecting the human body. It is well known that there is naturally a most surprising difference between one individual, or one family, and another, as to good health and the liabilities to disease. Why should not sanitary science recognize this difference more, and point out the way whereby great improvements can be made in the physical system, and then eradicate, upon a large scale, the first, the primary causes of disease? By commencing early, and with the use of proper means, the organization of every individual can be greatly improved and made more healthy; and by a proper application of the laws of inheritance for three or four generations, human organization may become so perfected as to diminish a large proportion of the sickness and disease that exist at the present day. This is not mere theory nor speculation, but a doctrine based upon the laws of physiology—laws which should be better understood. Inasmuch as such a change would be productive of sanitation in the highest degree, is it not the province of sanitary science to enter and cultivate this field? Would it not improve health and prolong life upon the largest scale and to the greatest number? What other science or agency can do this work so well? That human organization can be improved, by the laws of exercise, nutrition and inheritance, there can be no question. If the highest state of health depends on a normal standard of physiology, in which all parts of the body are perfect in structure, combined with a harmonious development of every organ, it is certainly the province of sanitary science to use all its appliances to obtain that standard. It is no more nor less than the same form or image in which man was created; and the same Almighty power has established laws by the use of which man, in the process of time, can attain to that of his original creation. The more thoroughly physiology is studied, with reference to sanitation, the stronger is the evidence that man is the artificer of his own physical well-being. The laws of inheritance must become the agents of sanitary science; and healthy offspring must become an object of primary importance. When the principles of physiology and sanitary science are both brought to bear in renovating human organization, we shall find that a wise provision is made for the redemption of the body as well as the soul. We can not expect this change will be brought about by divine interference, nor is it left for偶然 chance, but the means and responsibility are wisely placed in the hands and power of human agency.

In case the body is thus reconstructed,—made sound and healthy in every part,—the germs or seeds of disease will not be found in the system. Here is work for sanitary science on the largest possible scale. In making these changes, in order to secure the highest standard of health and to the greatest number, it will be seen that sanitary science has a great work to do. The whole system of education, especially in early life, must be based more and more upon the systematic training and development of the body. There are a multitude of evils in the present state of society that conflict with the laws of health and life, which sanitary science would remove or regulate.

Then, in all matters pertaining to mental improvement, to the progress of society, to every phase in civilization and the various developments of Christianity, the sanitation of the body and of the mind must be paramount to everything else. In fact, the province of sanitary science covers the entire life; not only of every individual, but of the whole human race.

No other subject or science is of such transcendent importance. It is in its infancy, and no comparison can be made between what it now is and the magnificent proportions it is destined to attain. Taking this view of physiology, and that health is its normal condition, it will be seen that all deviations from this state, or violations of the laws that govern it, furnish the causes or entrance of weaknesses, imperfections and diseases which afflict the human system. These changes may occur from internal predisposing causes, or from agents operating externally to the body. Just at this point, in these changes of organization from a normal to an abnormal state, we are taught most important lessons. On one side, we have sanitation and sanitary science; on the other, disease and its superstructure, medicine. Just here start the most powerful and destructive evils that ever befall the human family. These evils may be trifling in their origin, but increase—sometimes slowly, sometimes rapidly—and become terrible in their results. They include the whole catalogue of diseases; their name is legion. We dwell on this point, for it is very important to have clear and definite ideas of disease, its nature and cause. It is simply the penalty of violated law. There is no mystery in it; no visitation of Divine Providence; no curse inflicted by some evil spirit. It is no less important for sanitarians than for physicians to have a clear and definite knowledge of disease as well as its cause.

HISTORY OF SANITARY SCIENCE AS CONNECTED WITH THE MEDICAL PROFESSION.

Formerly the great object of the medical profession was the cure of disease. The program of studies and lectures in the medical schools was confined almost exclusively to this one idea. The term "hygiene" was scarcely to be found in books, or referred to in lectures. Physiology was comparatively a new science, and some of its most important applications have not been discovered, till within a few years. In fact, this science can not be fully understood in all its bearings without combining it with the principles of hygiene.

The study of physiology was formerly superficial, rather than profound; as the laws of health and life are based on this science, these of course were not very well understood. Hence there was great difficulty in ascertaining the real causes of disease and the natural laws that governed it. *Health and its normal conditions* must be first understood, and disease—its causes and treatment—come afterward. Very little thought or attention was given to the object paramount to all others: health and its requirements. The whole burden of medical studies and lectures was pursued with special reference to disease and its treatment. Thus in the preparation for the practice of medicine, the treatment of disease has so completely absorbed attention that normal physiology and the recuperating powers of nature have, in a measure, been overlooked. *"Vis medicatrix"* was a favorite phrase of some writers, but very little use has been made of its practical application. Two great evils have grown out of this defective mode of education: 1st, a lack of clear and definite ideas of disease and their causes; and 2d, a tendency, in the treatment of disease, to resort mainly to artificial means. But within thirty or forty years there has been decided improvement in respect to these evils.

The most efficient agents of all, for establishing and applying the principles of sanitary science, are boards of health. The first state board of health in this country was formed in Massachusetts in 1869, since which time boards have been started in nearly all the states of the Union. In 1872 the American Health Association was organized in New York. This is the most extensive and powerful agency of the kind in this country, and we think we may safely say in the world. It has published eleven large volumes, which contain a greater and more valuable collection of papers on sanitation than can anywhere else be found. The primary object of the association, as stated in its constitution, is the "advancement of sanitary science." A careful examination of the contents of these volumes affords the strongest possible evidence, that the association has done a grand work. Here almost every question connected with the science, in all its diversified applications, is found discussed. Some of the papers show great research and an originality of thought which might be elaborated into a volume. Besides its published works, the association has greatly advanced the interests of sanitary science in all the cities where it has held its annual meetings.

RELATIONS OF SANITARY SCIENCE TO THE PROFESSION.

While the success of this science depends mainly upon physicians, there is a wide difference in the interest which they take in it, as well as the sacrifices which they are willing to make for it. Let us inquire who, and how many, of our physicians have been actively engaged in this reformatory work? The number, compared with the whole profession, is not large,—in fact, is very small. Those engaged in this work are widely scattered both in city and country, and are generally active with the pen and tongue, so that they seem more numerous than they really are. There are, it is true, great numbers in the medical profession who are kindly disposed to sanitary reform, and speak highly of it in their practice, but, at the same time, are unwilling to make such sacrifice to advance its interests.

Unlike many other reforms and good works, there is a direct antagonism between the interests of this profession and sanitation. The support of this profession depends mainly on the *cure of disease*, not its prevention. Every step in this reform diminishes more or less professional income. There is no trade or speculation in this reform. When a person has spent years in study, and made large investments to secure a livelihood, how can we expect he will sacrifice these interests? There is probably no class of men, engaged in professional or other kinds of business, to whom appeals of so complex and antagonistic character are made for services. The success depends much upon the education and moral training of parties. On the one side stands out the highest welfare of the individual, and society in respect to health, while on the other side the physician is tempted to make his own interests paramount to all others.

Let us for a moment consider his position. In choosing this profession, the pecuniary considerations were undoubtedly most powerful; and, then, in his early preparations and through his whole course of study, compensation for professional services has been constantly kept in mind. The whole drift of medical study, and teaching by sickness or from books, has express reference to the

treatment and cure of disease,—not, as we may say, its prevention. Add to this the most implicit faith that all classes generally have in drugs, together with the crowded state of the profession, it will be seen that the physician is virtually constrained to have an eye constantly on his business. It is true that in medical studies, lectures and books, a great deal is said about the charitable aspects of the profession, and that it is always expected to give a large amount of service to the present time.

Perhaps the science has not created so general interest, nor taken so strong a hold, in the United States as it has in Great Britain; but still its history is one of marked interest. Let us notice a few of its salient points. From 1830 to 1840 Dr. John Bell conducted the *Journal of Health*, in Philadelphia, which very advocated the principles of hygiene. In 1835 Dr. Jacob Bigelow, in the annual address before the Massachusetts Medical Society, pronounced a certain class of diseases "self-limited" in their character, and urged that they should be treated accordingly. This was a marked step in the way of medical reform, which, with other influences, led to what was called the "expectant treatment of disease."

In 1842 was issued the first registration-report of births, marriages and deaths in Massachusetts, and has been continued annually, till we have now the forty-fourth report. Sanitary science has been greatly advanced by facts and arguments derived from these reports. Several other states have followed the course of Massachusetts, in establishing registration-departments. No one agency can do so much to advance the cause of vital statistics as such registration-reports. The application and progress of sanitary science depend much upon a knowledge of vital statistics; and the more thoroughly these are understood, the better for the cause of sanitation.

In 1844 Dr. Elisha Bartlett published in Philadelphia a work on the "Philosophy of Medical Science," and, in urging upon the profession a better knowledge of the cause and nature of disease, said:

"The next thing to be done is to find out the best methods of modifying and preventing disease. This is the great mission which now lies immediately before us: *this is to constitute the great work of the next and succeeding generations.*" This statement was made two years before that of Dr. Forbes, already quoted. Both these men, living in advance of the times, were distinguished for original thought and independence of expression, and they have proved themselves true prophets.

In 1860 one of the most brilliant addresses ever given in this country was delivered before the Massachusetts Medical Society by Dr. Oliver Wendell Holmes. As this had a direct tendency to promote sanitary science, the address and its reception deserve special notice.

At this time the importance of a more thorough study of *Nature* in medical practice had been urged on the profession in previous addresses and other medical papers published. In pursuing this line of thought, Dr. Holmes expressed very positive opinions, accompanied with reasons and illustrations, that too much medicine altogether was given by the profession, and that there were great evils arising from over-medication. For this opinion, Dr. Holmes was not only severely criticised by prominent physicians, but denounced and abused, if harsh language could do it. But reaction soon followed this violent attack. The discussion led many physicians to a new and more careful study of the natural laws of disease and the true effects of drugs. Great good came out of this controversy. Dr. Holmes, instead of being injured, gathered new laurels. Many young physicians, seeing the propriety and force of his strictures, struck out a new course in their practice.

The most efficient agents of all, for establishing and applying the principles of sanitary science, are boards of health. The medical appointments in Great Britain and in the United States. In the former the science receives a powerful support from the family and the state by probing the laws of inheritance; and a large amount of means is annually distributed among its advocates. Besides, there is on the part of the people more general intelligence on the subject,—a higher appreciation of the benefits of the science, and a more ready disposition to co-operate in carrying on the reform. Though the science has been making advances in these respects in the United States, there is much room for improvement. Our national government is not doing what it ought for public health; neither are the state or municipal authorities making the appropriations for it which they should.

Most of the contributions to sanitary science here have been voluntary. This reform has been carried forward by men heartily interested in the work,—very few seeking or expecting any remuneration. The reward for such services does not consist in dollars and cents, nor in the plaudits of the multitude, but in "the consciousness of duty done and noble deeds performed." A distinguished medical writer lately made this remark: "The most important work that sanitarians are doing at the present day is 'sowing seed which in time will yield abundant harvest'." And never in the history of medicine was there such a combination of circumstances so favorable to improvement in the practice of medicine. Never before has there been such earnest inquiry made on the part of the profession to ascertain the true causes of disease.

It has been found in the moral world, that in order to eradicate great evils, their primary causes must be first removed. So in the prevention of disease, the same course must be taken. This accords with the teachings of sanitary science. Leading members of the medical profession have here been doing noble work.

SANITARY IMPROVEMENTS IN MEDICINE.

Some twenty-five years ago Sir Joseph Lister, of Edinburgh, made a great discovery for the prevention of disease by introducing what has been called "Antiseptic Surgery." It had been found, prior to that time, that wounds and surgical operations were frequently followed by an inflammation which proved fatal. Surgeon Lister discovered that by an application of antiseptic dressings patients were more sure to recover from the most dangerous operations. It is, moreover, found that antiseptics can be applied to many diseases, as well as to surgical cases, which checks their progress and aids essentially in the recovery. It is now admitted that a great amount of disease is thus prevented, and a multitude of lives may be saved.

Again: in this same line of prevention, there has been made, within a few years, one of the greatest discoveries ever made in the history of medicine—that some of the most dangerous diseases are produced by infinitely small animalcules called bacteria and other micro-organisms. This subject is now undergoing most thorough investigations in Germany, France and Great Britain. If means can be devised whereby these bacteria can be destroyed, or their existence eradicated from the system, it will prevent a vast amount of disease.

Again: There seems to be a prevailing impression in the medical profession, that important changes are about to take place in the treatment of diseases. This sentiment is foreshadowed in a variety of ways, and many facts and illustrations might be cited in proof of the same. The most noticeable instance is the following: Dr. Austin Flint, of New York, was invited last year by the British Medical Association to give an address this year before that body. Dr. Flint died suddenly in March, but his address, by singular forethought, was found prepared for this occasion, which has since been published. The very title of the paper is significant—*"Medicine of the Future."*

No physician in the United States

could discuss this subject with greater propriety and force than Dr. Flint, and, inasmuch as he was to voice the medical profession in this country before the highest medical body in Great Britain, it shows the importance he attached to this topic in its selection. At the same time, in presenting these views, he must have been pretty well assured that they would be cordially received by the leading members of that association. After recounting the changes that had taken place in his own experience in medical practice, he says:

"We are entering upon a revolution in medicine. It is bewildering to project the thoughts into the future in order to foresee the changes which will be brought about in the coming half-century in our knowledge of the correction of diseases and the results as regards their prevention and treatment."

He expresses the opinion that hygienic agencies will be employed hereafter far more than they have been; that the normal conditions of health and the recuperative powers of nature will receive greater attention, and less dependence will be placed upon drugs and other artificial means. In referring to bacterial etiology, he says: "Here open to the imagination the future triumphs of preventive medicine in respect to all classes of diseases." When the medical profession, says he, "shall employ all the preventive measures possible and the best remedial medicines, disease will be more successfully treated, and the profession will have reached a high ideal position." Alongside of this testimony, we will quote the opinions of three distinguished English physicians who have given special attention for many years to sanitary science.

Says Dr. B. W. Richardson: "The influence which sanitation will exert in the future over the science and art of medicine, promises to be momentous. It promises nothing less than the development of a new era; nor is it at all wide of the mark to say that such new era has fairly commenced. With the progress of sanitary science we must expect to see preventive medicine taking the ascendency. With true nobleness of purpose, true medicine has been the first to strip herself of all mere pretences to cure, and has stood boldly forward to declare as a higher philosophy the prevention of disease. The doctrine of absolute faith in the principle of prevention indicates the existence of a high order of thought, of broad views on life and health, on diseases and their external origin, on death and its correct place in nature."

Says Dr. Alfred Carpenter: "The science of disease-prevention is destined to alter the whole field of medical practice; to render obsolete much of our present knowledge as to the history of diseases and the measures which are now required for their treatment. The inquiry must come as to how the increase of disease is to be prevented, rather than, having arisen, how it is to be cured. This will not apply to every kind of complaint, and will not be limited to any one class." Says Sir Henry Acland: "In addition to treatment and cure of disease, whatever be the duty of individuals, medical science and art collectively must aim as a whole—1st, At the preservation of health; 2d, At the averting of disease from individuals and the public generally; 3d, At rearing healthy progeny for the family and the state by probing the laws of inheritance; and, 4th, At procuring legislation effectual to these ends. It claims, therefore, a voice in moral education as well as physical training. It holds a duty in relation to the diminution of vice, for the sake not only of self-destructive victims, but more for the sake of the innocents whom they ignorantly slay."

It would seem that in the opinion of Dr. Acland sanitary science covers very important ground. This opinion may be accounted for in part, from the fact that he has long been a professor at the Oxford University,—has had large experience in educational matters, and understands the full import of physiological laws. If the preservation of health or prevention of disease is accomplished by improving the organization, a multitude of other improvements follow, and the more perfect the former, the greater will be the latter.

There is one method of preventing disease, referred to by Dr. Acland and other writers, which has never received the attention it deserves—that is by the observance of the laws of inheritance. Within a few years, this subject has been considerably discussed in the United States and Great Britain, but few seem to appreciate fully the magnitude of its bearings on sanitation. The diseases considered preventable,—of which there are nine or ten—come under the zymotic class, but there are two other classes, called constitutional and local, each larger than the zymotic. Thus far, sanitary science has expended its principal force upon this class; but supposing its agencies could be brought to bear equally upon the prevention of diseases, is there not a vast amount of good it would accomplish? Let us explain. For many years there has been a class of diseases called "Hereditary," because the predisposing causes were inherited,—because they are transmitted from generation to generation, and thus run in families. Now, if those ancestors were free from any taint, or in other words, had perfectly sound and healthy constitutions, the seeds, the germs, the predisposing tendencies of disease would not be transmitted. Let us carry out a little farther this line of argument.

The same kind of evidence which proves that the germs of, or predisposition to disease, are transmitted in a single instance, applies to all others of a similar character; and the legitimate inference is that there must exist in nature a great general law. Such a law, we believe, exists, and is based upon a normal standard of physiology,—a standard for the government of the human body, wherein all its parts are perfect in structure, and its organs harmonious in their functions. This standard of organization constitutes the highest measure of health; is free from all kinds of weakness, as well as predisposition to disease. But, unfortunately, we do not find such organized standards in the present state of society—only approximations; and the nearer individuals or families approach this standard, the sounder the constitution, the less disease; whereas, the further the deviations diverge from this standard, the greater are the weaknesses and liabilities to disease. Here come in the laws of inheritance,—starting not in a perfect, healthy organization, but in conditions of the body where changes of some kind have taken place in the vital forces of the system. To understand and utilize these laws, they must be reduced to some system: the distinct relations between the causes and the effects must be traced out, till we find a great general law serving as a standard of appeal, or a regulator to all the minor ones.

There can be no question but that in the inheritance of *morbid tendencies* we have one of the most fruitful sources of disease. This will become more patent in proportion as the principles of physiology shall become better understood in

their connection with hereditary influences. Without attempting to describe the various ways in which the seeds of disease, or the predisposing causes, are transmitted from parent to child, we may say they are *manifest*,—in organization or function; in defective or abnormal structure; in the weak or excessive development of this or that organ; in the quality of the blood, and the marked predisposition to certain diseases, like scrofula and consumption.

A class of diseases called "hereditary" have existed since the days of Hippocrates, and have always been considered difficult to treat, and much less to cure. Very little attention has been paid to these complaints by sanitarians, as it was supposed they could not easily be prevented. But this is a mistake; they originate from the violation of law by human agency: they can, then, certainly be prevented.

It is admitted by physiologists that all parts of the body can be changed by proper exercise and the law of nutrition,—some parts increased in size and strength more than others,—so that in this way a far greater measure of health can be secured. It is found that decided improvements can be made in the physical system during the lifetime of an individual, and that in three or four generations the human constitution may reach a higher state of perfection. If nature has, therefore, established a physiological standard of health,—which is seldom, if ever, liable to disease,—and at the same time it is well understood this standard is attainable, should not the greatest possible efforts be put forth to secure and maintain this standard? It is here in this field where the germs (the seeds), the primary causes, of a vast amount of disease, are to be forestalled. In this warfare with disease we have been content to lop off a few branches, leaving intact the trunk and roots. We have been battling the enemy in the outskirts, without attempting to take the citadel. Here is a great work for sanitary science; here this science is destined to reap its richest harvests. It may take time; but reforms in which the highest welfare of mankind are involved never remain stationary.

SANITATION OF THE FUTURE.

In drawing this discussion to a close, a few suggestions may seem appropriate. While quoting from Dr. Flint's address on "Medicine of the Future," the inquiry arises, Is not sanitary science also to have a "future"? Most assuredly. Its past history is very brief

Allen (Nathan).

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